Goals:

- Become familiar with the scope of civil engineering.
- Become familiar with several design considerations and procedures that are relevant to civil engineering.
- Become familiar with the design standards that govern engineering design.

Problem Statement:

A major retail chain desires to develop the northwest corner of the intersection of a state highway and a city street. The company has hired you to design the road improvements that will be necessary to handle the increased traffic that their new store is expected to generate.

Location Background:

- The highway and the city street are both two lane roads.
- The intersection has stop signs on the two approaches.
- A gas station occupies the southeast corner of the intersection and a small strip mall occupies the southwest corner.
- There are open drainage ditches on both sides of the highway and the city street.
- The city owns 30 feet of Right-of-Way on either side of the street.
- The state owns 50 feet of Right-of-Way on either side of the highway.
- There is a sanitary sewer line located on the west side of the street which is located 15 feet off the edge of pavement.
- There is a water line located on the east side of the street which located 15 feet off the edge of pavement.
- There are overhead power lines on the south side of the highway located on the back edge of the Right-of-Way.
- The speed limit is 55mph on the highway and 35 mph on the street.

Other Information:

- The area for this development is seeing a great deal of new development with several new residential areas having recently been constructed to the south of the intersection.
- There is an elementary school and an assisted living community located about half a mile to the north
- The contour of the land generally slopes away to the south.

Tasks:

Your design team has been directed to assess the following items in your design:

1. **Road Capacity** – Consider the expected increase in traffic volume at the intersection versus the capacity of the existing road. Determine whether or not the approaches to the intersection need to be widened to include multiple lanes. If so, what length of the road segment needs to be widened and how many lanes are needed? Are dedicated turn left turn lanes needed? Dedicated right turn lanes?
2. **Right-of-Way and Utility Easements** – Based on your findings from the previous task, do the city and/or state need to acquire additional Right-of-Way for these improvements? How much?
3. **Traffic Control** – Consider what type of traffic control is needed. Are traffic signals warranted? What type of signing is needed, if any?
4. **Pedestrian Access** – Consider the presence of pedestrian traffic in the area. Should sidewalks and pedestrian crossings be included in the project? Do pedestrian crossings need to be signalized? Should compliance with the Americans with Disabilities Act (ADA) be considered? If, so what provisions need to be addressed?